INSTALLATION & OPERATION GUIDE

MODELS

PR5
PR6

PERFORMANCE

NILES®

BLENDING HIGH FIDELITY
AND ARCHITECTURE®

Congratulations!

Thank you for choosing a Performance In-Wall Loudspeaker from Niles. With proper installation and operation, you'll enjoy years of trouble-free use.

Niles manufactures the industry's most complete line of custom installation components and accessories for audio/video systems. To see the complete Niles product assortment, visit us on the Internet at: www.nilesaudio.com

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Introduction

The PR or *Performance* group of in-wall loudspeakers offers speakers expressly designed for an optimum balance of *performance* and value. They employ high *performance* components and materials that make them perfectly suited as primary speakers in bedrooms, dens or living rooms; as main or surround speakers in home theaters.

A PR5/PR6 Speaker Kit; and the corresponding Bracket Kit (5 or 6) is required to install one pair of PR5/PR6 in-wall loudspeakers in either new or existing construction.

Features and Benefits

Talc-Filled Polypropylene Woofer with Butyl Rubber Surround and Custom Debris Screens
The Niles PR Performance series loudspeakers employ a high performance woofer made of vacuum formed polypropylene with talc added for stiffening. The resulting cone offers low mass, good damping and superb musicality. Additionally, the woofer employs a Butyl Rubber Surround for improved midrange clarity as well as moisture resistance. Custom debris screens prevent insulation from coming in contact with the woofer.

3/4" Kaladex® Tweeter housed in a Precision Adjustment Mechanism
The PR Performance series Kaladex® Tweeter employs DuPont's latest material technology to produce a dome tweeter with exceptional frequency response and low distortion. Highs are crystal clear and extended without the harshness often associated with polycarbonate designs.

The Kaladex® tweeter is housed in a precision adjustment mechanism which permits the tweeter to be accurately positioned after installation for optimum performance without the diffraction distortion endemic to other speaker brands utilizing traditional pivoting tweeters.

Antiresonant Wave Bracing
The PR speaker's baffle design employs specially molded ribs that increase the rigidity of the baffle and raise the resonant frequency so that less "out-of-phase" cancellation takes place. Equally important, the ribs are curved and crossed to further shift vibration modes away from low-bass canceling frequencies. This keeps bass tones rich and dynamic.

Front-Mounted Bass & Treble Controls
Niles Performance speaker models feature baffle-mounted tone controls for Bass and Treble that enable instant fine tuning after the speakers are installed. This feature helps to lessen the effects of less than perfect placement or other room acoustics anomalies.

Snap-in Baffle Assembly
This proprietary Niles design enables installers to attach Niles loudspeaker assemblies to installed frames without additional hardware or tools. Niles' Snap-in design makes it easy to upgrade Niles speakers after installation without the hassles associated with removal and re-installation of traditional designs. Snap-in baffles make installation of Niles speaker baffles easier and faster than other in-wall brands.

BumpBack™ Woofer Magnet
Niles engineers have utilized a unique motor construction enabling far greater "throw" or voice coil excursion. This allows a high level of bass performance to be achieved.

Moisture Resistant Construction
The PR loudspeakers are suitable for use in high moisture environments. The drivers are impervious to moisture; the grille is made of powder-coated aluminum, and all exposed hardware is made of stainless steel. However, the speakers are not waterproof and direct contact with water should be avoided.

Absolutely Flush to the Wall Appearance
The unique mounting system of the PR loudspeakers powerfully clamps the frame to the bracket, sandwiching the wall material between them. Because the clamping action is totally uniform around the frame, there are no shadows or gaps between the wall and the frame. Additionally, the Niles mounting system is carefully optimized to stiffen the surrounding drywall and prevent it from resonating. You hear only the music, not the drywall.

Easy Retrofit Installation in your Existing Home
Designed for ease of installation, the Niles mounting system makes retrofit installations simple and fast. A supplied template assures fast and accurate hole cutting. The bracket slips behind the drywall and the screws secure the frame to the bracket, sandwiching the drywall between them. The speaker baffle attaches to the frame, and the grille mounts over the speaker.

Three Stage Installation System for Remodels or New Construction
You install only the parts you need for a particular stage of construction. When the framing and wiring are finished, you install the *bracket*. After the drywall is up, but before the painter begins to paint, you install the *frame* and provide the rustproof aluminum *grilles* to the painter so that they can be painted to match the surroundings. Only when construction is completely finished do you put the valuable *speaker* in the wall. You don't have to mask or prep the speaker for painting, and worries about theft during the final phases of construction are never an issue!

Low Diffraction, MicroPerf™ Aluminum Grilles
PR speakers include aluminum grilles. The painted aluminum grille has hundreds of precisely sized perforations, creating an acoustically transparent grille.

Infrared Sensor Mount
The speaker baffle has a locator designed for the Niles MS110 MicroSensor®, a miniature infrared sensor. The MS110 installs discreetly behind the aluminum grille and therefore minimizes wall clutter in your home. When you want to control your equipment, you simply point your remote control at the speaker from up to 15 feet (5 meters) away.

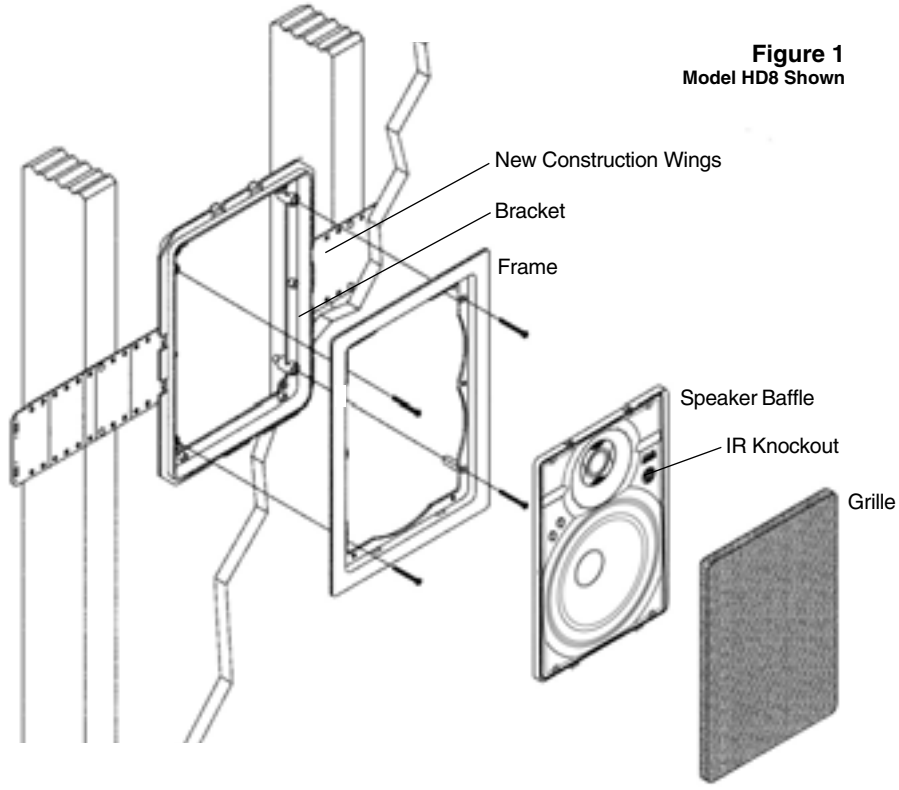


Figure 1
Model HD8 Shown

Installation Considerations

Recommended Amplifier Power
For satisfactory performance, we recommend an amplifier with a power rating of ten to one hundred watts for the PR5; and ten to one hundred twenty-five watts for the PR6. Curiously, most speakers are not damaged by large amplifiers but by small amplifiers. If your system is playing loudly, a small amplifier will run out of power very quickly. When an amplifier runs out of power it creates damaging "clipping" distortion. A large amplifier will play at the same volume without distorting. See the section on operating the speakers for more information about clipping distortion.

Incorporating a Local Volume Control
In a multiroom system there is one indispensible device for true convenience—a local volume control. It allows you to adjust the volume of the speakers without leaving the room.

Plan to wire the system so that each pair of speakers has its own volume control built into the wall (think of a volume control as a dimmer switch for sound).

Niles makes a wide range of high performance indoor and outdoor volume controls. They are available in standard or Decora® style cover plates (just like your light switches and dimmers). Volume controls are connected in line with the speak

er, so you must connect the wire from the amplifier to the volume control and then from the volume control to the speaker.

Speaker Wire

Use 2-conductor speaker wire when connecting PR speakers to your receiver or amplifier. For most applications, we recommend you use 16 or 18 gauge stranded wire. For wiring runs longer than 80 feet (25 meters) we recommend 14 gauge stranded wire. When you run wire inside walls, special jacketing (CL-2 or CL-3) is required to both protect the wire and for fire prevention. In some areas conduit is required. For a trouble-free installation, low voltage wire such as speaker wire must be run in accordance with the National Electrical Code and any applicable provisions of the local building code. If you are unsure of the correct installation techniques, wire jacket or type of conduit to use, consult a professional audio/video installer, your building contractor, or the local building and inspection department.

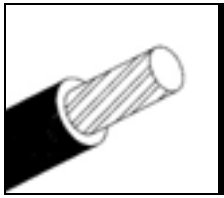
Incorporating a Remote Control

If you are planning to use a stereo system with a hand held IR remote control, consider the advantages of installing a Niles IR Repeater system. You are able to control all of the functions of your system from the room via the remote pair of speakers. Niles makes a number of IR sensors which install in the wall, in the ceiling, in cabinetry, on tabletops, or even behind the grille of some of your Niles speakers.

An IR sensor requires that a 2-conductor shielded wire (West Penn D291 or equivalent) be home run from each sensor location to the main equipment location. This wire is normally run beside the speaker wire at the same time. Typically, the sensor is placed in a location that faces your listening position. Most remote controls will have an effective line of sight range of 18 to 30 feet (6-10 meters) with any Niles sensor placed in a wall, ceiling, on a cabinet or tabletop. However, when you place a Niles MS110 MicroSensor behind the perforated aluminum grille of a speaker the effective range is reduced to 9 to 15 feet (3-5 meters).

Insulating the Wall Cavity

For best performance from your speakers fill the wall cavity behind the speaker with fiberglass insulation (e.g. R-19 unbatted insulation). Try to keep the same amount of insulation for each speaker, particularly in the same room, for consistent bass response.



TECH TIP

Wire size is expressed by its AWG (American Wire Gauge) number. The lower the number, the larger the wire, i.e. twelve AWG is physically larger than fourteen AWG.

Speaker Placement

Placement for Critical Listening

If you like to imagine that the band or orchestra is playing in front of you as you listen to music, or you are very conscious of clarity, detail and the textures of the individual instruments, you are a critical listener.

In a home theater, the intelligibility of dialog and action reproduced by the front speakers is paramount! The position of the speakers plays a very important role in how clear the sound is and how a stereo image is created. Here are some guidelines to make the process of placement quick and easy.

Make sure the sound will not be blocked or reflected off of furniture or other objects. You should have a direct line of sight with the front of the speaker. To determine the best position, measure the "listening" distance between the ideal listening position (your favorite chair or couch) and the wall in which you plan to install the speakers. Try to place the speakers so that they are equally distant from your listening spot and at least one half of the listening distance apart (this maintains a large pleasant stereo "image"). In home theater applications where there is a center channel you may choose to space the left and right main speakers farther apart for a "bigger than life" sound with Dolby® encoded movies and TV shows. However, for combined music and movie usage stay within the *good placement zone* for music. For example; if you are ten feet back from the wall, the speakers should be between five and ten feet apart **(See Figure 2)**.

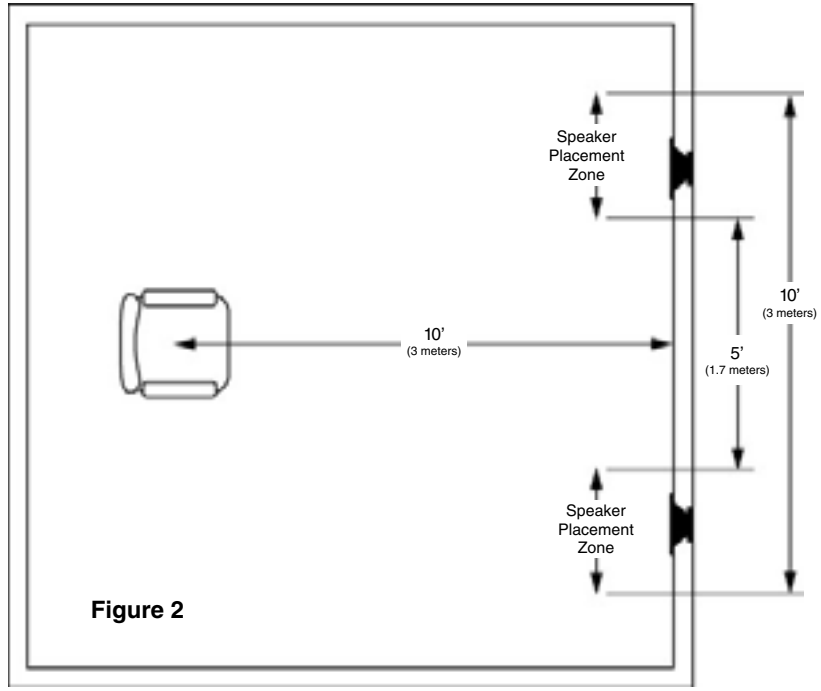


Figure 2

The Boundary Effect

Corners can affect the bass response of the speaker powerfully! This is called the boundary effect. You will emphasize particular bass frequencies and cancel out other bass frequencies when you place speakers close to the wall/ceiling boundary or a corner wall boundary. This can make the speaker sound excessively boomy and inaccurate to some listeners, while to others it just seems like more bass sound. A good rule of thumb is if you always listen to your current pair of speakers with the bass turned up, you'll enjoy corner placement. If you keep your tone controls at neutral, try to keep the speakers at least two or three feet from the boundaries of the room.

Placement for Varying Listening Positions

If you want the freedom to sit anywhere in a room facing any direction, and/or find that you prefer the "all around you" sound of some car stereos to a conventional "sound stage" facing you, consider the speaker placement techniques professional installers use in restaurants and bars. They place speakers in an array around the listening area, so that the music is always surrounding you, regardless of the direction you face.

The rule of thumb is to add one pair of speakers for every 100 to 200 square feet of listening area. Curiously, this is not so that you can play the music louder, but so that you can play it softer! When you have only one pair of speakers in a large room you will notice that when the sound is perfect in one part of the room, it is too loud near the speakers. By placing more than one pair in the room you will avoid these "hot spots" of loud sound and you will create more sonic ambiance while maintaining clarity and a rich sound everywhere.

You can make listener position still less critical by using mono rather than stereo. This can be difficult to achieve with normal stereo amplifiers. However, Niles manufactures Systems Integration Amplifiers® which enable one room to be wired in stereo while other rooms are wired in mono! Consult your local Niles dealer for more information.

In smaller rooms or rooms that are infrequently used, you typically can't justify the expense of more than two speakers. Try to bracket the room with the two speakers. Diagonal placement is a very effective way to stretch the coverage pattern of two speakers. You can also compromise between direct sound (for detail and clarity) and reflected sound (the ambient or "all around you" effect). By trying to place the speakers so that they create as much reflected sound as possible you emphasize the ambient effect. They can be up high in the wall or even down low at power outlet height , in the ceiling, near corners, or directed at reflective objects and walls. The more reflected sound there is in the room the stronger the ambient effect at low volumes. You should use moderation, however, otherwise the compromise becomes too one sided and at high volumes, the sound will be blurred and less distinct.

Placement for Rear Home Theater Applications

In a home theater, the goal is to reproduce the experience of a great movie theater in our homes. The biggest difference between the two is the rear or surround speaker array in a commercial theater. Here, it is not uncommon to see twenty or thirty speakers around the audience. This huge array of speakers assures that you will feel completely surrounded by the ambient soundtrack of the movie. Film makers try to use the "surround" soundtrack to envelope you in the environment on screen. They will place background music, rain sounds, traffic noise, etc. on the "surround" soundtrack. In a home with a single pair of speakers it is easy for the jungle sounds to sound like they are "in the middle of your head" just like headphones!

A single pair of PR loudspeakers, properly placed, can create a very convincing simulation of an array of speakers. If you place them near a hard reflecting surface you can make one pair of speakers sound like several. Create as many reflections as possible by mounting the speaker up high in the wall so that the ceiling will act as a powerful reflector. If you place the speakers near a corner, wash the sound down a wall from a ceiling location, or mount the speakers as far away as you can from the listening area, more reflections will occur. However, all of these placement techniques require that you work your surround sound amplifier channels harder. If the surround sound system you are using has a small five or ten watt amplifier for the rear speakers, stay within five to eight feet of the listening location. If you are using a 25 to 50 watt amplifier you can mount the speakers 10 to 15 feet away from the listening location and still achieve reasonably high volume levels.

Of course, the best way to emulate the sound of multiple speakers is to use multiple speakers. In large or unusually shaped rooms this might be the only way to achieve a good effect. If you like to listen to music surround modes which emulate concert hall acoustics, more than two surround speakers will prove extraordinarily effective. With Niles PR loudspeakers it is easy to add another pair without affecting the decor of the room. However, you will need to use a much more powerful amplifier than that which is built into a typical surround sound receiver or amplifier. Niles makes a number of Systems Integration Amplifiers® with proprietary features that make them uniquely suited to enhance a good surround sound system. Consult your local Niles dealer for more information.

Speaker Placement

Installation Fundamentals

Running the Speaker Wire in New Construction

If you have doubts about whether you are capable of installing a Niles PR loudspeaker in your walls, consult a Niles dealer or professional installer. They have special tools, techniques, and experience to make the impossible possible. The installer can provide you with an estimate before any work is done.

Scheduling and Preparation

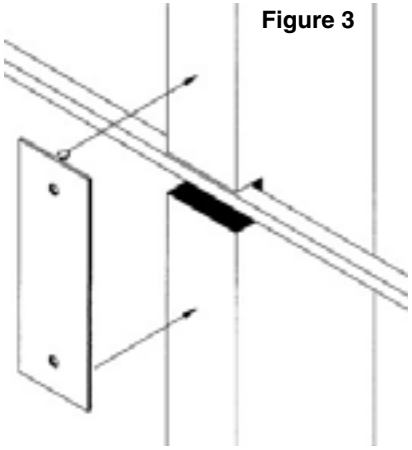
Plan to schedule the speaker wiring after the electrical wiring is finished. That way you can avoid wire routes which could potentially induce hum over the speaker wire. The basic rules are:

• Never run speaker wire through the same hole as an electrical cable.

• Never run speaker wire into the same J-box as electrical cable.

• Avoid running the speaker wire beside the electrical cable. Keep your speaker cable at a distance of at least 18″-22″ (46-56 cm) from any electrical power cable. Side-by-side wiring is unavoidable in particular spots in every house, just move the speaker wire route away as soon as possible. If construction forces a side by side run for more than ten feet, install metal conduit or shielded speaker wire. Low-voltage wires such as doorbells, intercoms, telephone, security, or television cannot cause interference or hum on your speaker wires, so you can safely run all of them at the same time, through the same holes, side-by-side.

Figure 3



Before you drill any holes, mount the speaker brackets in the desired speaker locations and mount p-rings or open backed J-boxes where the in-wall volume controls and stereo equipment will be.

Safety First!

Wear gloves, safety goggles and head protection when drilling. Avoid nails, they ruin bits and they can create injury. Pay particular care when using “hole-hogs” and other powerful electric drills; the torque of the drill when suddenly stopped by a nail can break the wrist of a strong man.

Drilling

Use a bit that is large enough for the wires you plan to run. An auger bit is the preferred bit for rough-in wiring. It will actually pull itself through the wood, so that the drill motor, not you, does most of the work. You may be drilling a lot of holes, so this is an important consideration.

Always drill the holes in the center of the stud. If you have to notch the stud or drill the hole closer than one inch from the edge of the stud, protect the wire with a nail plate **(See Figure 3)**.

When drilling holes in ceiling joists drill in the center of the joists and try to locate the hole near the end of the joist. DO NOT drill through a “gluelam” or any load bearing beam without the direction of your contractor.

Try to line the holes up perfectly, because it makes pulling the wire much easier. A good technique is to snap a chalk line across the face of the studs or against the bottom of the ceiling joists. Then work backward so that you can always see the holes you have already drilled. Paying careful attention to this will save you a lot of time later on!

Pulling the Cable

Pull the cable in sections (from the stereo to the volume control, from the volume control to the speaker). Start with the longest sections and use left over wire to complete the short sections. If you plan to pull many rooms at the same time through a central route, walk off the distance to each destination, add a generous fudge factor for turns and other obstacles, then cut off each section so that you have a bundle of wires you can pull at once.

Whenever you run the wire further than four and one half feet from a hole in a stud or joist (open attic space, going up walls, etc.), fasten the wire to the joists or studs using cable clamps or appropriately sized wire staples. The wire should not have large sags in it, nor should it be too tight. Try to protect the wire from being stepped on in attics or other unfinished crawl spaces. There are guard strips, raceways and conduits which can be used to protect the cable. Consult the local building code for special requirements in your area.

Concealing Speaker Wire in Existing Walls

This is actually a fairly simple task if you restrict your choice of speaker locations and wire routes to the interior walls or ceilings of your home. Interior walls in almost all North American residences are hollow, so that it is easy to flush mount speakers into them and route new speaker cable around the house. What you see when you look at the painted wall board, plaster, or paneling is only the skin of the wall. Behind the skin is the skeleton; two-by-four wood or metal “studs” running vertically from the floor to the ceiling in walls and two-by-six or larger “joists” running horizontally in the ceilings and floors. In between the studs and the joists is the space for the wiring and plumbing of your home.

Exterior walls are different. They must insulate the house from the heat and cold outside, so they are stuffed with insulation. The national building code requires that the hollow wall space in exterior walls be broken by a horizontal stud placed between the vertical studs. This “fire blocking” makes it very difficult to retrofit long lengths of wire. In some areas of the country the exterior walls are constructed of solid masonry, and have no hollow space for speakers or wires.

Start by examining all the possible routes you might take to run the speaker wire from the speaker to the volume control and back to the stereo. Use a stud sensor or other device to locate the internal structure of the wall. You want to avoid all studs or joists. A typical route would be: from the speaker location up the inside of the wall to a new hole drilled into the top “plate” (horizontal two-by-four at the top of the inside of the wall), into the attic crawl space, then down to the volume control location through another top plate, back up to the attic, across the attic, and finally down another plate to the wall behind the stereo system itself **(See Figure 4)**. The other very common route is through the bottom plate of the wall into an unfinished basement or crawl space.

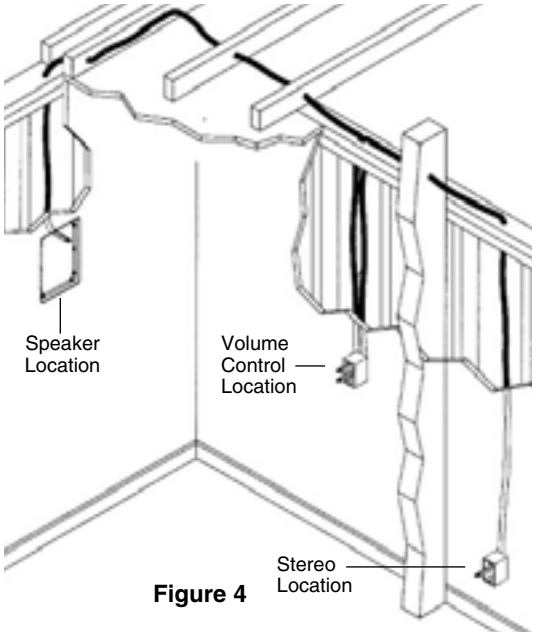


Figure 4

Identify where all of your electrical, phone, and TV wiring is likely to be and plan to route around it all. You can accidentally induce 60 Hz hum on your speakers if you run your speaker wire right beside electrical wire for more than a few feet. Try to keep speaker wire running parallel to power cables at least 3 feet away. To find exactly where an electrical cable is routed, try inspecting the inside of the wall by turning off the breaker for a particular power outlet or switch, removing the cover plate and switch or receptacle, and shining a penlight into the wall. If you have access to an attic or basement space you can quickly see which part of the wall space is free of obstructions **(See Figure 5)**.

When you don't have access above or below the wall, try to estimate the existing wire and pipe locations from the positions of electrical outlets and plumbed fixtures on both sides of the wall. Take a look at the outside of your house too, sometimes conduit, vents or drain pipe will be visible that give useful information. Choose the route with the fewest potential obstacles.

If your house is built on a slab or you are wiring between two finished floors, look for baseboards which could be removed and replaced with the wire behind them. Doorjambs can be removed and often have enough space for speaker wire all the way around the door **(See Figure 6)**.

Sometimes, an under-the-carpet run is possible (there are special flat speaker wires made for under-the-rug wire runs). As a last resort, heating and air conditioning vents can be used as wire raceways for plenum rated wire (check your local building codes, some municipalities require conduit).

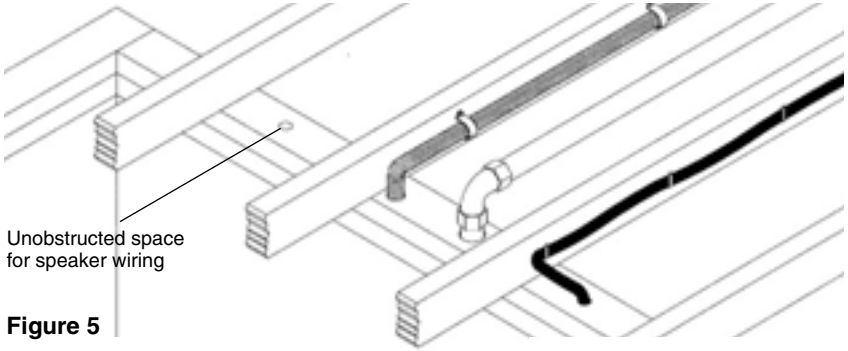


Figure 5

In traditional wood stud/drywall construction you can cut the hole for the speaker and utilize the large hole to auger holes across, up or down the wall for as far as your drill bit will take you. If you have matching paint and take reasonable care in patching you can cut a hatch in the drywall at each stud, run your wire, and patch and touch-up the wall **(See Figure 7)**.

When you are dealing with the unknown because of the structure of your home, or with difficult to patch wall materials like plaster, lath and plaster, faux finishes, wallpaper etc., be patient. A careful study of the potential problems before you start the job will pay off.

Figure 6

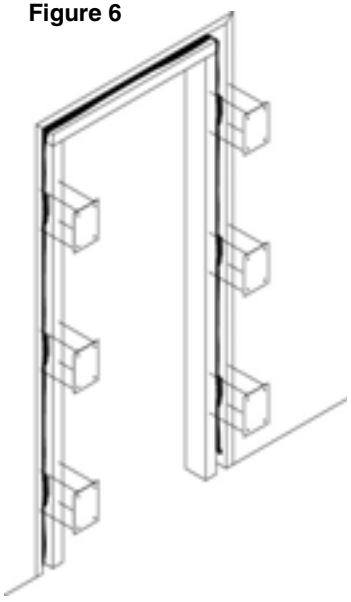
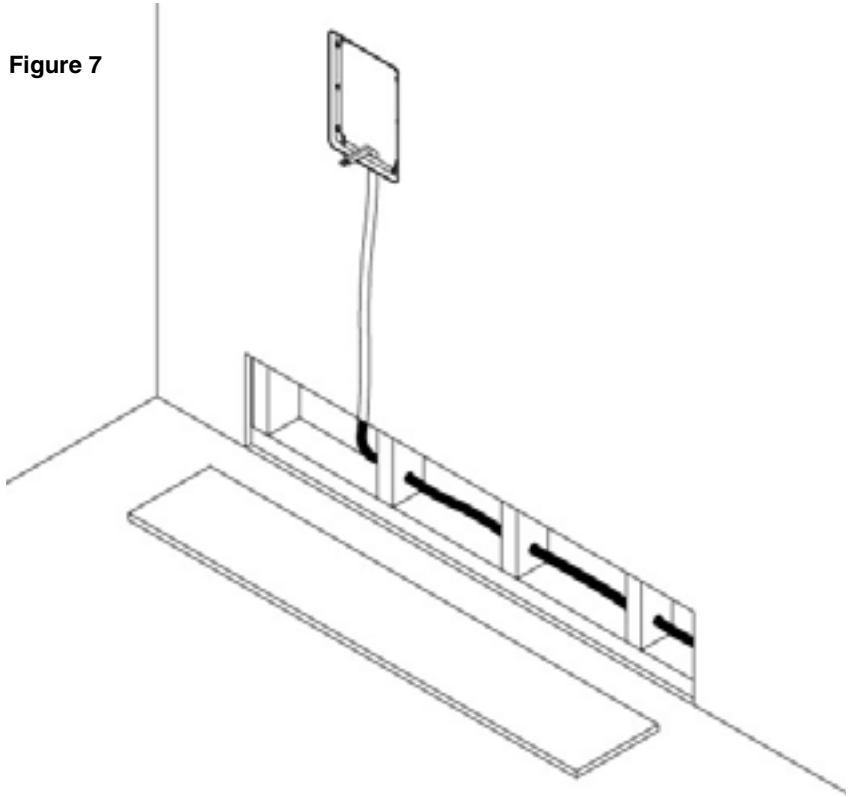


Figure 7



Installation of Brackets, Frames and Grilles in New Construction

Stage One: Before Drywall is Hung. Insulating the Wall Cavity.
If feasible, fill the wall cavity with insulation at this point.

Attach the wings to the bracket by snapping them into the sides of the bracket. The wings can be shortened by breaking them along the scored lines if their length will interfere with a corner or eaves. You can mount the bracket horizontally or vertically **(See Figure 8).**

Screw one side of the assembled bracket with wings to the stud using one of the supplied screws. Level the bracket. Screw the other side of the bracket to the stud. Two or three screws (depending upon the size of the model) on each side makes for a very secure installation. Attach the wire to the bracket at the indicated wire tie points **(See Figure 9)**.

Stage Two: Before Paint
Screw the frame to the installed bracket using the supplied screws. Do not overtighten the screws. This will distort the frame and the grilles will not fit (this is not permanent, just loosen the screws and the grille will pop in) **(See Figure 10)**.

Painting the Aluminum Grilles
The grille is important to the sound of the PR loudspeakers. Do not fill the holes of the grille with paint. The grille is constructed of aluminum with a perfectly even powder coat overall. This powder coat is an ideal primer.

Remove the grilles before painting. If you are using spray paint, use two thin coats without any primer. If you are using a compressor and a spray gun, use the finest, most diffuse setting. Practice first on some paper if you have no experience painting with spray paint.

If you are using an applicator or brush, and a can of paint, thin the paint first. You do not want to have to poke hundreds of holes in your beautifully painted grilles.

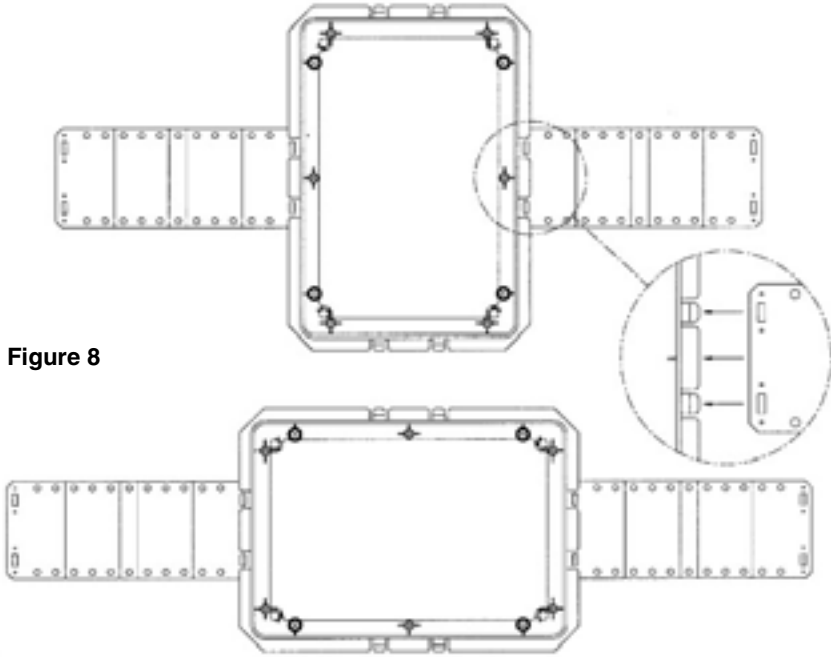


Figure 8

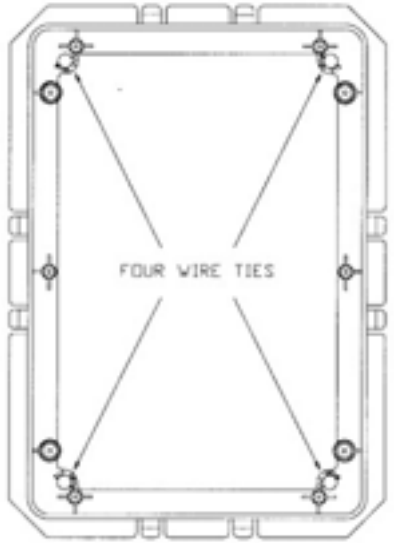


Figure 9

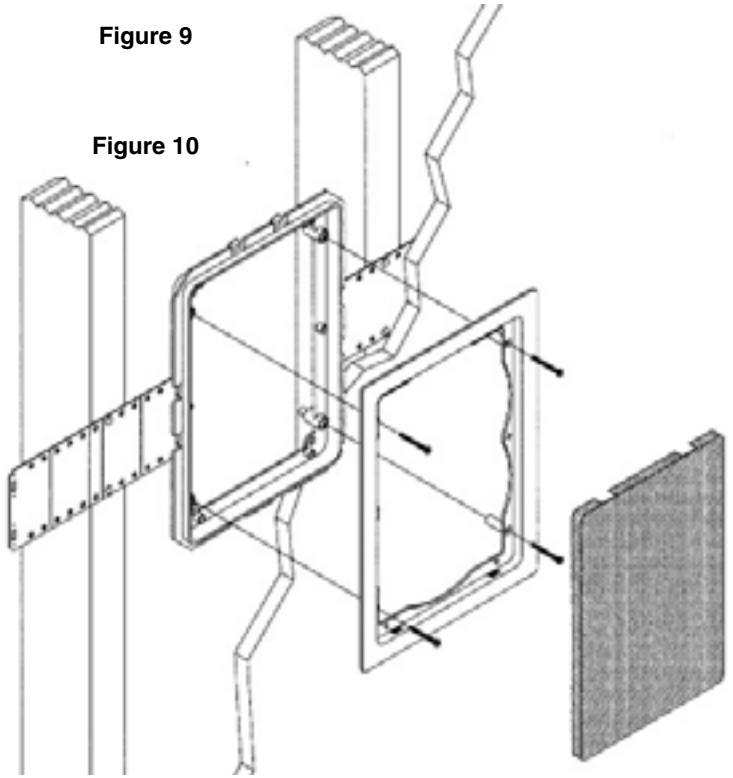


Figure 10

Installation of Brackets, Frames and Grilles in Existing Walls

IMPORTANT: Before you cut into any wall, review the sections on running wire and speaker placement.

1. Drill a 1/8" pilot hole just barely through the wallboard or dry wall (1/2" to 5/8" deep in most homes) about an inch below the center of your proposed speaker location (an inch to the side if you are mounting the speaker horizontally). BE VERY CAREFUL NOT TO DRILL THROUGH EXISTING WIRES, PIPES, OR STRUCTURE. IF YOU FEEL ANY EXTRA RESISTANCE AS YOU ARE DRILLING, STOP. Cut a piece of coat hanger equal to the width of the bracket. Bend the wire in half creating a right angle. Poke the "L-shaped" wire into the pilot hole and turn

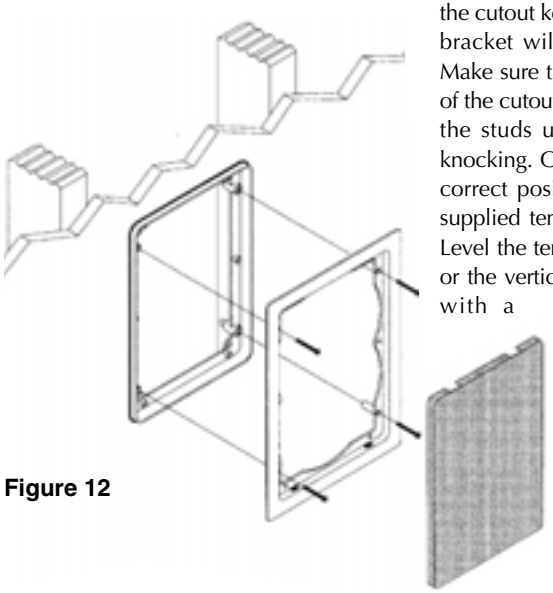
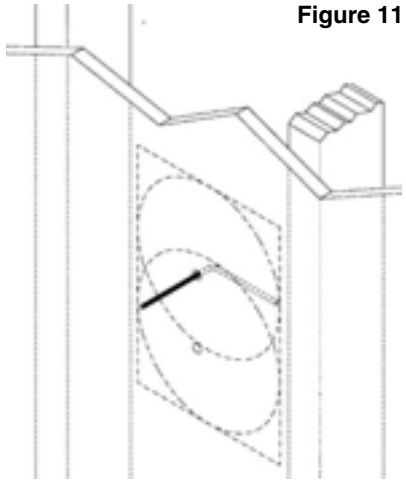


Figure 12

Figure 11



it in a complete circle. If it turns freely, repeat the procedure from a hole about an inch above the center of your proposed speaker location **(See Figure 11)**.

If the wire's movement is obstructed by a pipe or cable, fill the hole (s) with spackle or other patching compound and try another location.

2. When determining the final location of the cutout keep in mind that the frame and bracket will extend beyond the cutout. Make sure that you do not place the edge of the cutout directly next to a stud. Locate the studs using a stud sensor or hand-knocking. Once you have determined the correct position for the cutout, hold the supplied template up to the wall surface. Level the template in either the horizontal or the vertical position and mark the wall with a pencil. Drill the four corners with a 1/4" drill bit.

3. If you are cutting a painted or wall papered drywall use a sheetrock or keyhole saw. Cut the hole with the saw at a 45 degree angle. That way, the drywall section can be replaced cleanly if there is an unseen obstruction behind the wall. BE VERY CAREFUL NOT TO SAW THROUGH EXISTING WIRES, PIPES, OR STRUCTURE. IF YOU FEEL ANY EXTRA RESISTANCE AS YOU ARE CUTTING, STOP.

4. If you are cutting into lath and plaster walls, use masking tape to outline your penciled marks, drill the four corners with a 1/4" bit and use a razor to score the plaster down to the lath beneath. Then use a chisel to remove all of the plaster within the taped outline. Finally, insert a metal cutting blade into a sabre saw and very slowly and carefully saw the lath. Sawing the lath can easily vibrate plaster off the wall. If you have the patience, use a pair of tin snips to slowly nip away at the lath instead. There is no risk with this method, it is just time consuming.

5. Fill the wall cavity with insulation at this point. Remember to use equal amounts of insulation for each speaker.

6. Slip the mounting bracket through the hole and pull it toward you so that its front edge slides into the hole and stops in place.

7. Attach the frame to the bracket by screwing the frame to the bracket using the supplied screws. Do not overtighten the screws, this will distort the frame and the grilles will not fit (this is not permanent, just loosen the screws and the grille will pop in). The screws should pull the frame and bracket together (sandwiching the drywall) so that the frame is absolutely flush with the wall surface. There should be no gaps between the wall and the frame **(See Figure 12)**.

Installation of the Speaker, Sensor and Grille in New or Existing Construction

Installing a Niles MS110 MicroSensor
There is a 1/2" round molded "IR Sensor Knockout" on the face of the speaker baffle. To prevent damage to the crossover network you must remove the knockout from the rear of the speaker. Do not attempt to remove the knockout with the speaker face up. Lay the speaker face down on a clean carpet or rug. Put the tip of a screwdriver into the center of the round "knockout" and sharply tap the screwdriver handle as necessary. Install the MS110 using its mounting hex nut and washer so that it is tightly secured to the speaker. Connect all wires and continue your installation.

Installing the Speaker

If the grille is already installed, remove it by using a bent paper clip or the tip of a corkscrew and pulling it away from the frame **(See Figure 13)**.

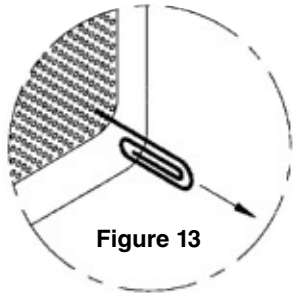


Figure 13

1. Separate the speaker end of the two-conductor speaker-wire run to free at least 2″ of each conductor.

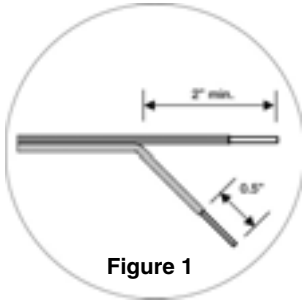


Figure 1

2. Strip 1/2″ of insulation from the end of each conductor. **(See Figure 1)**

3. To connect the stripped end of one conductor to the black terminal, push down on the black terminal lever. Insert the stripped end of the conductor into the opening. Release the pressure on the lever.

4. Repeat #3 with the other conductor and the red terminal.

5. Connect the opposite ends of these conductors to their respective amplifier terminals. Pay attention to the markings on the wire. If you are unsure which conductor to insert into which terminal, see the section titled "Speaker Phase" in the owner's manual.

6. Repeat these instructions for each speaker you are connecting to the amplifier.

7. Place the speaker baffle in the frame by inserting the tabs at the base of the speaker baffle into the corresponding holes in the frame and pushing the speaker forward until the snaps engage. **(See Figure16)**

8. IMPORTANT: When installing the speakers in the ceiling, or if the installation is in an earthquake zone, it is recommended that you utilize the enclosed sheet metal screws to secure the baffle to the frame.

a. Locate the dimples on the front baffle.

b. Place the self-tapping sheet metal screw in the dimple and turn it with a screw driver until it cuts through the baffle and anchors securely in the frame. **(See Figure 17)**

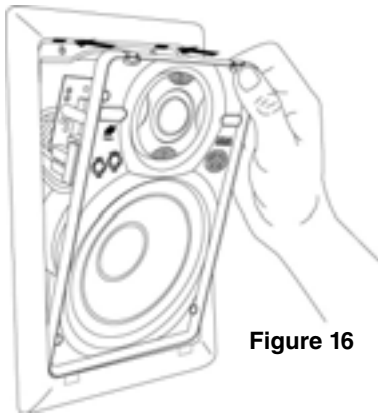


Figure 16

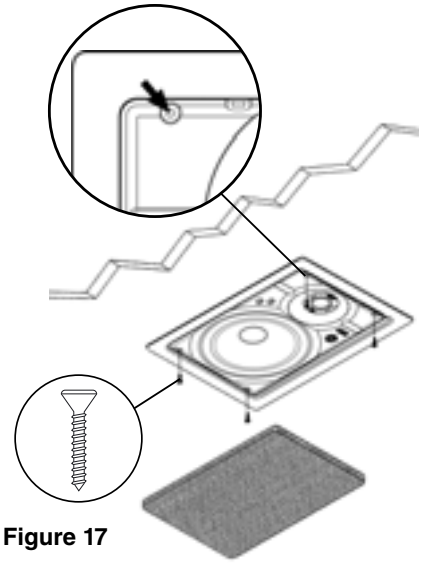


Figure 17

Speaker Phase

Speaker wire has two conductors. One conductor is attached to the negative (-) terminals and one conductor is attached to the positive (+) terminals of both your speaker and your amplifier. Usually, the wire is marked for your convenience. There are different ways wires are marked: a stripe on one wire, a ribbed area of one conductor you can only feel, different colors of metal wire on each conductor, or there might be a fabric strand or string wound into one of the conductors. Of course, there are some wires which appear completely identical. Be careful, or you might make a mistake.

If you make a mistake, one speaker will be playing "out-of-phase" with the other speaker. An out-of-phase pair of speakers work against each other and the sound of the two speakers playing together will be lacking in bass and be "phasey" sounding. If you suspect the sound is not right and you cannot see any markings on the wire, try this simple test:

1. Stand half way between the two speakers.

2. Play some music with the amplifier or radio set to Mono.

3. Listen to the richness of the bass and the loudness of the sound.

4. Turn off the amplifier and reverse the connections on one amplifier channel only.

5. Repeat the listening test with the same setting of the volume control. When the sound has a richer bass and is slightly louder the speakers are working together or "in-phase".

Adjusting the Bass and Treble Controls

The PR Performance loudspeakers feature separate baffle-mounted bass and treble controls for fine tuning after installation. Each control provides for approximately 3dB in steps of 1dB of Bass or Treble reduction. This is useful if the speakers are placed near boundaries (Bass Cut) or in a room with highly reflective surfaces like glass or tile. (Treble Cut). **(See Figure 18)**

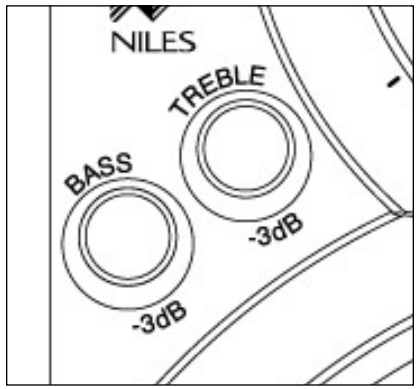


Figure 18

Adjusting the Tweeter

The tweeter is housed in a precision adjustment mechanism which enables precise aiming of the directional high frequencies to provide optimum performance. To adjust the tweeter:

1. Carefully grasp the tweeter housing by placing your thumb and forefinger in the indentations provided.
2. Rotate the tweeter housing either clockwise or counter clockwise as required. The mechanism is indexed at equal intervals so that both speakers in a pair can be adjusted equally. Simply count the number of "clicks" as the first tweeter is adjusted. Repeat the process for the second speaker, rotating the tweeter the same number of "clicks" in the opposite direction **(See Figure 19)**.
3. Pivot the tweeter on both speakers equally by depressing the housing at the arrows until the desired angle is achieved **(See Figure 20)**.

Installing the Grille

Carefully fit the grille into its recess so that it is barely in place. Starting with one corner, go around the speaker, pushing the grille in a little bit each time. You should be gentle, the aluminum grille can be easily bent out of shape. The speaker will have an absolutely flush appearance when it is properly installed.

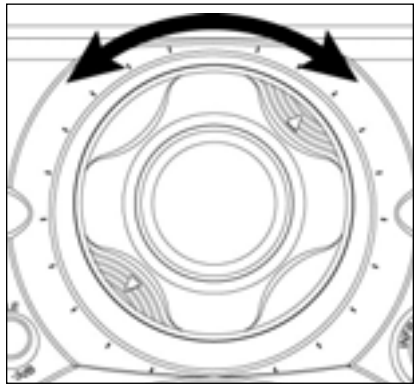


Figure 19

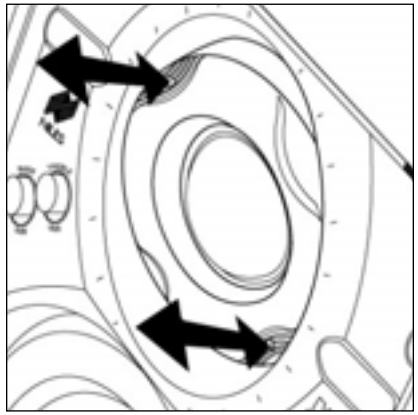


Figure 20

Removal of Speaker and Grille

Removing The Speaker

If the grille is already installed, remove it by using a bent paper clip or the tip of a corkscrew and pulling it away from the frame.

Utilizing two small screwdrivers or two needle nose pliers, release the snaps that hold the speaker to the frame. Insert the screwdrivers into the holes in the snaps and exert force straight down (towards the woofer) until the snaps release. Once the snaps release, the speaker can be tilted away from the frame to be removed. Do not attempt to use the frame for leverage, as this may damage the surface of the frame **(See Figure 21)**.

Figure 21

Operation

Listening at Higher Volumes

It requires more power to achieve a reasonable volume of sound in a large room than it does in a small room. It is possible (even if you are not a teenager) to turn the volume so high that the amplifier *runs out of power*. This creates "clipping" distortion.

Clipping distortion makes treble sound very harsh and unmusical. When you hear harsh sounding treble from any good speaker, turn the volume down immediately! Those harsh sounds are masking some much more powerful ultra-high-frequency sound spikes which will quickly damage any fine loudspeaker. You are much less likely to damage a speaker with a large amplifier because it will be very loud indeed before it produces any clipping distortion.

Cleaning

You can clean the speaker with a dampened soft cloth or paper towel. If the speaker is mounted high up on a wall or ceiling, use a broom to gently brush it off.

Specifications

Model PR5

Driver Complement
5-1/4″ Talc-Filled Polypropylene Woofer with Custom Debris Screen and Butyl Rubber Surround

3/4″ Kaladex® Tweeter Housed in a Low Diffraction Precision Adjustment Mechanism

Design Principle
Infinite baffle for large and varying air volumes

Recommended Amplifier Power
Ten to One Hundred Watts per Channel

Nominal Impedance
8 Ohm

Frequency Response
70 Hz to 20,000 Hz, plus or minus 3dB (on axis)

Dispersion Pattern
90 degrees Horizontally or Vertically (plus or minus 5dB)

Sensitivity
88 decibels for 2.83 volts of Pink Noise, measured at 1 meter on axis

Overall Exterior Frame Dimensions
7-1/8″ x 9-7/8″ (18.1 cm x 25.1 cm)

Depth Behind Wall
3-1/8″ (7.9 cm) Deep
(assumes 1/2″ drywall)

Wall Cut-Out Dimensions
6-1/4″ x 9″ (15.9 cm x 22.9 cm)

Wiring Requirements
We recommend 16 to 18 gauge stranded for up to 80 feet, 14 gauge stranded for up to two hundred feet. Connectors accommodate 12 to 18 gauge stranded wire.

Specifications

Specifications

Model PR6

Driver Complement
6-1/2″ Talc-Filled Polypropylene Woofer with Custom Debris Screen and Butyl Rubber Surround

3/4″ Kaladex® Tweeter Housed in a Low Diffraction Precision Adjustment Mechanism

Design Principle
Infinite baffle for large and varying air volumes

Recommended Amplifier Power
Ten to One Hundred Twenty Five Watts per Channel

Nominal Impedance
8 Ohm

Frequency Response
60 Hz to 20,000 Hz, plus or minus 3dB (on axis)

Dispersion Pattern
90 degrees Horizontally or Vertically (plus or minus 5dB)

Sensitivity
89 decibels for 2.83 volts of Pink Noise, measured at 1 meter on axis

Overall Exterior Frame Dimensions
8-3/4″ x 11-11/16″ (22.2 cm x 29.7 cm)

Depth Behind Wall
3-1/8″ (7.9 cm) Deep
(assumes 1/2″ drywall)

Wall Cut-Out Dimensions
7-5/8″ x 10-5/8″ (19.4 cm x 27.0 cm)

Wiring Requirements
We recommend 16 to 18 gauge stranded for up to 80 feet, 14 gauge stranded for up to two hundred feet. Connectors accommodate 12 to 18 gauge stranded wire.

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